

MSME forging unit reduces energy bill by 31% through energy efficiency measures!

Background

Pune, in Maharashtra, is a forging industry cluster. Large-scale units account for about 65–70% of the cluster’s forging production, while MSMEs account for the remaining 30–35%. There are over 50 MSMEs producing forged components, with 20 heat treatment MSMEs functioning as their vendors. The production capacity of these units varies from 500 tonnes to over 3500 tonnes per annum (tpa).

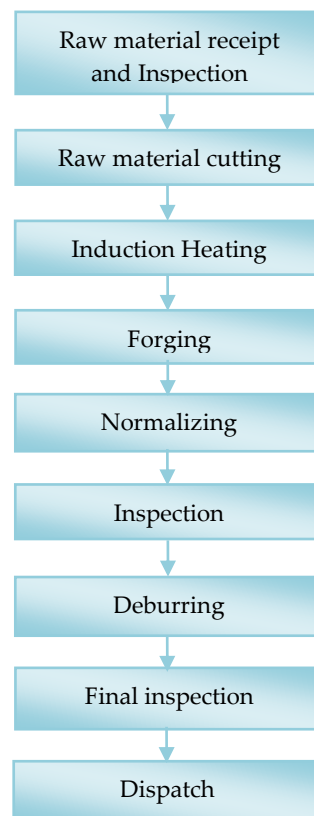
Unit profile

M/s P10 is an MSME unit that manufactures forged auto components such as hubs, rocker arms, flanges, yokes etc., producing about 1200 tpa. The annual energy bill of the unit was INR 144 lakhs, which was around 8% of total turnover. The annual energy consumption was around 238 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 78% (185 toe) and grid electricity 22% (53 toe).

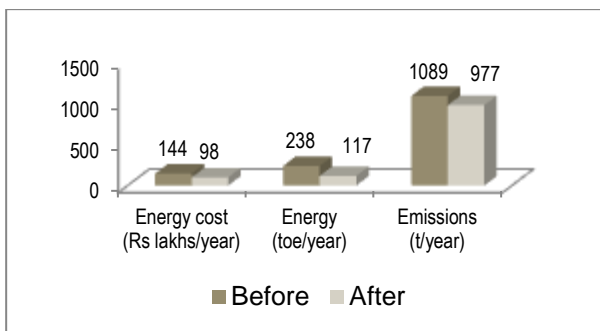
Process description

Steel rods are cut into billets, which are heated in an FO-fired furnace and forged with hammers and presses. The components are then subjected to heat treatment processes like normalizing, and undergo deburring to give the final products.

The major energy consuming equipments used were four FO-fired furnaces (three for billet heating, one for normalizing), two electrical induction furnaces (for billet heating), and electrical motors associated with process equipment such as air compressor, pumps, etc.



Overall Impact: post-implementation



Overall Impact
 31% reduction in total energy bill (i.e. annual savings of INR 46 lakhs) with a simple payback of 1.7 years

This case study has been prepared under WB GEF Project titled “Financing Energy Efficiency at MSMEs in India”. The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Replacement of an FO-fired forging furnace with induction billet heater

Baseline Scenario

1. The unit was operating an FO-fired forging furnace of capacity 500 kg per hour. Its efficiency was only around 8%.
2. The unit was operating an FO-fired normalizing furnace of capacity 300 kg per hour. Its efficiency was below 8%.



Recommendations

The unit was advised to:

- (1) replace the 500 kg/hour FO-fired furnace with an energy efficient induction billet heater of rating 400 kW (1000 kg/hour capacity);
- (2) replace the FO-fired normalizing furnace with an energy efficient electrical rotary hearth furnace of rating 45 kW (250 kg/hour capacity).

Implemented

As recommended, the unit:

- (1) replaced the 500 kg/hour FO-fired furnace with an energy efficient induction billet heater of rating 400 kW (1000 kg per hour capacity) at a cost of INR 32.6 lakhs. The new system consumes about 348,706 kWh of electricity annually, but saves about 133,400 litres of FO.
- (2) replaced the FO-fired normalizing furnace with an energy efficient electrical rotary hearth furnace of rating 45 kW (250 kg/hour capacity) at a cost of INR 15.8 lakhs. The new system consumes about 28,126 kWh of electricity annually, but saves about 21,900 litres of FO.



The total investment of INR 77.3 lakhs on these two measures (including INR 28.9 lakhs on auxiliaries) is saving about INR 45.6 lakhs annually. The simple payback period is 1.7 years.

Support provided under the project

- Walk-through & Detailed energy audit
- Identification of energy efficiency interventions in the unit
- Finalization of specifications for the energy efficiency interventions
- Identification of technology providers/vendors
- Facilitation for interactions between unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

Disclaimer: This case study has been compiled by TERI on behalf of SIDBI under WB-GEF Project. While every effort has been made to avoid any mistakes or omissions, these agencies will not be in any way liable for any inadvertent mistakes/omissions in the publication.

For further information please contact:

Energy Efficiency Centre, Small Industries Development Bank of India (SIDBI), Ground Floor, E-1, Videocon Tower, Jhandewalan Extension, Rani Jhansi Road, New Delhi-110055, India, Ph. 011 23682473-77, www.sidbi.in

